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DISSERTATIONS PRESENTED FOR ACADEMIC DEGREE
OF DOCTOR OF TECHNICAL SCIENCES IN USSR (1946-1952)

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Docent A. S. Sergeyev

[Note: Authors of dissertations are listed alphabetically according to the institutions at whose scientific councils their dissertations were read. In most cases, each dissertation is followed by a short resume of the work.]

Power Engineering Institute Imeni Krzhizhanovskiy, Academy of Sciences USSR

Geyler, L. B. -- "Theory of and New Method for Calculating Electric Drive of Irreversible Rolling Mills With Induction Motors" (defended 18 March 1948). Official opponents: Professors D. P. Morozov, Ye. V. Nitusov, and B. P. Aparov; and T. G. Soroker (all Doctors of Technical Sciences).

Popkov, V. I. -- "Investigation of the Electric Field of Conductors Exhibiting Corona and the Theory of Power Losses to Bipolar Corona in High-Voltage DC Power Transmission" (defended 25 March 1948). Official opponents: Professors A. A. Vorob'yev and N. A. Kaptsov (Doctors of Physicomathematical Sciences); A. M. Zaleskiy and S. P. Zhebrovskiy (Doctors of Technical Sciences).

Sviridenko, P. A. -- "Operating Conditions of Induction Machines With Variable Parameters" (defended 14 March 1946). Official opponents: Professors D. A. Gorodskiy, Yu. S. Chechet, and A. N. Larionov (all Doctors of Technical Sciences).

A circuit is given for a cascade induction generator to generate power for a network at constant voltage and frequency when the speed of the prime mover varies.

Institute of Automatics and Telemechanics, Academy of Sciences USSR

Kreytser, V. L. -- "Nonlinear Distortions of Signal Wave Forms in Amplifiers" (defended 6 December 1946). Official opponents: V. V. Migulin and Professor S. Ye. Khaykin (Doctors of Physicomathematical Sciences), and Professor L. G. Tager, Doctor of Technical Sciences.

Kreytser commented on the inadequacy of existing methods for investigating and evaluating the nonlinearity of nonacoustic signals, which are based on harmonic analysis in application to amplifiers of these signals. He introduced characteristics of nonlinearity (the subject of investigation) for examination and described a new method. He proposed to divide distortions into two categories (first and second order), which allowed extension of methods for examining properties of amplifiers to some other types of equipment. To investigate nonlinear distortions of the first order, Kreytser proposed use of a periodic triangular saw-toothed signal with its subsequent differentiation, while he examined some partial cases of second-order nonlinearity and proposed methods for investigating them. He described universal measuring apparatus developed and built on the basis of the proposed methods and oscillograms produced by it which confirmed the theoretical conclusions cited.

Shumilovskiy, N. N. -- "Dampers in Measuring Systems" (defended 12 February 1948). Official opponents: V. I. Kovalenkov, Corresponding Member, Academy of Sciences USSR; M. A. Gavrilov, Doctor of Technical Sciences; and Professor K. B. Karandeyev.

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Shumilovskiy covered the design, calculation, and analysis of hydraulic, pneumatic, and graphite-filled piston-type dampers.

Tsyppkin, Ya. S. -- "Systems With Delayed Feedback" defended 6 February 1948). Official opponents: Academician A. A. Andronov; Professors K. F. Teodorchik, Doctor of Technical Sciences; Professor K. M. Polivanov; and B. N. Petrov, Doctor of Technical Sciences.

Tsyppkin examined systems with delayed feedback, developed stability criteria and methods for investigating the degree of stability, and constructed transient and forced processes for linear systems. Methods were also developed for investigating self-induced oscillations in nonlinear systems. The methods were used for analysis and calculation of systems for automatic regulation of pressure and temperature of a servo system, an aircraft automatic pilot, ultra-short-wave generators, klystrons, systems with distributed parameters, and others. The theory described is applicable to analysis and calculation of complex systems with lumped parameters, which can be approximately replaced by simple equivalent systems.

Leningrad Physicotechnical Institute, Academy of Sciences USSR

Glazanov, V. N. -- "Electrostatic Separation of Minerals" (defended 29 November 1948). Official opponents: L. M. Sapozhnikov and Ya. I. Frenkel', Corresponding Members, Academy of Sciences USSR; Professor I. M. Verkhovskiy, Doctor of Technical Sciences; and Professor D. N. Nasledov, Doctor of Physicomathematical Sciences.

Glazanov's work was devoted to clarification of the physical basis for electrostatic separation of minerals and the physics of frictional electricity. On the basis of a large amount of experimental data, the author developed a type of electrostatic separator. He examined the problem of electrostatic enrichment of coal fines and cited data on enrichment of coals from different Soviet coal basins at laboratory and pilot-plant installations.

Leningrad Polytechnic Institute imeni Kalinin

Arutyunov, V. O. -- "Basic Theoretical Problems and A New Design Principle for Ratiometers" (defended 3 January 1949). Official opponents: Professor P. L. Kalantarov, Doctor of Technical Sciences; Professor S. I. Zilitinkevich, Doctor of Technical Sciences; and Professor A. V. Ulitovskiy, Doctor of Physicomathematical Sciences.

On the basis of postulates relating to all electrical measuring instruments of the electromechanical group, Arutyunov worked out a general theory of ratiometers and determined the conditions for their correct operation. He developed a new type of ferrodynamic single-coil ac ratiometer, which he called a compensation ratiometer, and worked out the theory and calculation procedure for this instrument.

Renne, V. T. -- "The Problem of Reducing the Specific Volume of Paper Capacitors" (defended 20 October 1950). Official opponents: P. P. Kobeko, Corresponding Member, Academy of Sciences USSR; Professor A. M. Zalesskiy, Doctor of Technical Sciences; and Professor B. M. Tareyev, Doctor of Technical Sciences.

Renne developed a new type of capacitor using a semiconducting impregnation. An innovation in the dissertation was the method Renne proposed for studying leakage and self-discharge of capacitors.

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Shlyaposhnikov, B. M. -- "Ignitron-Rectifier Traction Substations for Electrified Main Railway Lines" (defended 8 December 1947). Official opponents: M. P. Kostenko, Corresponding Member, Academy of Sciences USSR; and Professor L. R. Neyman, Doctor of Technical Sciences.

Vasil'yev, D. V. "Induction Synchronous-Tie Systems" (defended 11 March 1946). Official opponents: Professors V. K. Popov, S. A. Press, and N. A. Livshits (all Doctors of Technical Sciences).

A theoretical analysis of synchronous-tie induction systems, including establishment of criteria for applicability of diagrams constructed by Vasil'yev to single-phase selsyns.

Moscow Aviation Institute imeni Ordzhonikidze

Chistyakov, N. I. -- "Remote Transmission and Servo Systems in Aircraft Navigation Instruments" (defended 28 October 1946). Official opponents: Professor V. K. Popov, Doctor of Technical Sciences; Professor B. P. Aparov, Doctor of Technical Sciences; and Ye. F. Antipov, Chief Designer of OKB (Experimental Design Bureau).

Chistyakov advanced theoretical premises governing the calculation of remote ac and dc electric transmission for rational selection of circuits and parameters in the planning of navigation systems. He developed a theory of the types of remote transmissions least studied and of greatest interest. He investigated the basic factors determining servo-system operating conditions in navigation instruments and analyzed general principal circuits of compass units.

Moscow Power Engineering Institute imeni Molotov

Faynberg, Yu. M. -- "Problems of the Electrification of Irreversible Cold-Rolling Mills. A Theory for Increasing Tension and Radically Increasing Productivity" (defended 12 March 1948). Official opponents: Professors A. I. Tselikov, Ye. V. Nitusov, and D. P. Morosov (all Doctors of Technical Sciences).

Faynberg presented proof that raising rolling speeds and accelerations improves tension conditions and increases the mill's stability.

Gol'dfarb, L. S. -- "Stability and Self-Induced Oscillations in Nonlinear Automatic Regulation and Control Systems" (defended 24 September 1948). Official opponents: S. A. Lebedev, Member, Academy of Sciences Ukrainian SSR; Professor P. S. Zhdanov, Doctor of Technical Sciences; and Professor B. N. Petrov, Doctor of Technical Sciences.

Gol'dfarb described a method for solving problems of stationary motions in nonlinear regulation systems, using the concept of equivalent impedance of a nonlinear element and determining its value for a number of nonlinearities which are often encountered in regulation circuits. The principle of the method is separation of the nonlinear element of a system and separate plotting of the impedance characteristic of the nonlinear element and the amplitude-phase characteristic of the linear part of the system. The point where the characteristics intersect determines the conditions of self-induced oscillations in the system, their frequency, and amplitude. The plotting of characteristics also makes it possible to investigate the problem of stability of motion. The proposed method is distinguished by its simplicity and its graphic nature, making it easily applicable in practice to calculations of systems described by differential equations of any order. Gol'dfarb carried out an analysis of regulation systems with nonlinear elements of zero and nonzero order and examined the influence of parameters on frequency and amplitude of self-induced oscillations in nonlinear systems with vibration regulators. He cited experimental results of investigations of self-induced oscillations in some regulation systems. Calculated and experimental results correspond closely.

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Komar, V. G. -- "Theory of the Operation of Solid Rectifiers in Nonlinear Control Circuits" (defended 14 October 1949). Official opponents: A. Yu. Ishlinskiy, Active Member, Academy of Sciences Ukrainian SSR; Professor L. R. Neyman, Doctor of Technical Sciences; and Professor E. A. Meyerovich, Doctor of Technical Sciences.

Komar examined in detail those dependences related to the operation of selenium and similar rectifiers, as well as nonlinearly inductive coils in circuits with cyclic voltage and current variation. He described methods for calculating electric circuits with rectifiers and saturable reactors, citing concrete recommendations for the selection of their dimensions. Komar thoroughly analyzed the operation of a rectifier with semiconductor cells under different operating conditions, on the basis of which he developed his calculation method, which he called "linearization within the limits of a cycle." He examined the problem of determining the optimum dimensions of semiconductor rectifiers and steel-cored reactors.

Sinel'nikov, Ye. M. -- "Influence of Higher Harmonics of the Magnetic Field on the Starting of Squirrel-Cage Electric Induction Motors" (defended 7 May 1948). Official opponents: Professor V. Yu. Lomonosov, T. G. Soroker, and Professor B. P. Aparov (all Doctors of Technical Sciences).

Sinel'nikov made a theoretical and experimental investigation of factors causing parasitic rotating moments and magnetic noises in squirrel-cage induction motors.

Soroker, T. G. -- "Magnetoelectric Alternating-Current Machines" (defended 4 April 1947). Official opponents: I. S. Bruk, Corresponding Member, Academy of Sciences USSR; Professor A. S. Kantor, Doctor of Technical Sciences; and Professor B. P. Aparov, Doctor of Technical Sciences.

Soroker examined problems of the theory and calculation of magnetoelectric machines on the basis of the specific properties of permanent magnets and the special design features of permanent-magnet machines.

Syromyatnikov, I. A. -- "Special Operating Conditions of Synchronous Generators to Increase the Dependability of Operation of Power Systems" (defended 22 February 1952). Official opponents: S. A. Lebedev, Active Member, Academy of Sciences Ukrainian SSR; Professor D. A. Gorodskiy, Doctor of Technical Sciences; and Professor Yu. S. Chechet, Doctor of Technical Sciences.

Tareyev, B. M. -- "Heat-Stable Electrical Insulation" (defended 18 April 1948). Official opponents: Professor N. V. Aleksandrov, Doctor of Technical Sciences; Professor N. P. Bogoroditskiy, Doctor of Technical Sciences; Professor G. I. Skanavi, Doctor of Physicomathematical Sciences; and Professor B. M. Gokhberg, Doctor of Physicomathematical Sciences.

Tareyev treated factors affecting the heat stability of electrical insulation, the determination of heat stability of materials, and its dependence on chemical composition, as well as problems related to the thermal conductivity of insulation. He also cited the results of a number of his scientific research works and new production developments dealing with concrete forms of insulating materials with relatively high heat stability: liquid and solid organic materials, aluminum oxide insulation, asbestos materials, glass-fiber materials, vitreous enamels, mica, and its substitutes.

Tyagunov, G. A. -- "Fundamentals for the Calculation of Vacuum Systems" (defended 26 December 1947). Official opponents: Professor A. K. Timiryazev, Doctor of Physicomathematical Sciences; Professor I. L. Kaganov, Doctor of Technical Sciences; and Professor S. O. Gvozdover, Doctor of Physicomathematical Sciences.

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Tyagunov treated in detail the theory of the calculation of systems used for creation of a vacuum in electronics and physics installations. He covered the simplest systems (for stationary, nonstationary, and quasi-stationary conditions) as well as typical more complex systems.

Yevtyanov, S. I. -- "Transient Processes in Radio-Frequency Amplifiers" (defended 14 November 1947). Official opponents: A. N. Shchukin, Corresponding Member, Academy of Sciences USSR; Professor L. Ya. Zhekulin, Doctor of Technical Sciences; and Professor V. A. Kotelnikov, Doctor of Technical Sciences.

Yevtyanov studied processes in linear selective four-terminal networks, to which class belong rf and if amplifiers in radio receivers and transmitters. Using the van der Pol method and classical procedures of operational calculation, he developed a special apparatus for calculating slowly changing envelopes at the output of selective four-terminal networks. On the basis of the general method he studied transient processes in different rf-amplifier circuits resulting from switching dc and harmonic voltages on and off at the input as well as from rapid phase and frequency variations.

Moscow Electrical Engineering Institute of Communications

Furduyev, V. V. -- "Dynamics of Electroacoustic Transducers" (defended 27 June 1946). Official opponents: Professor S. N. Rzhavkin, Doctor of Physicomathematical Sciences; Professor L. D. Rozenberg, Doctor of Technical Sciences; and Professor S. E. Khaykin, Doctor of Physicomathematical Sciences.

Furduyev set up primary fundamentals, methods, and basic relationships for analytical electroacoustics which was developed as a general theory of acoustic apparatus which electromechanically transduces audio-frequency oscillations. Using general methods and relationships, he investigated a number of partial cases of engineering interest (electrodynamic, electromagnetic, capacitor, and piezoelectric transducers).

Katayev, S. I. -- "Problem of Obtaining Electric Pulses of Arbitrary Form" (defended 12 April 1951). Official opponents: Professor S. E. Khaykin, Doctor of Physicomathematical Sciences; Professor Yu. B. Kobzarev, Doctor of Technical Sciences; and Professor L. I. Gutenmakher, Doctor of Technical Sciences.

Katayev investigated the possibility of using the nonlinearity of volt-ampere characteristics of different elements in an electric circuit. It was demonstrated that graphite and carbon (karbovidnyy) resistors can be used only in the simplest cases, while ferromagnetic elements have more general properties. Katayev described an original method for generating a given voltage wave form with the help of a ferromagnetic system as well as a method for using a frequency modulated exciter. He investigated the elementary pulse forms necessary to produce the resultant wave form. The results of the research, which show the feasibility of replacing the given wave with a fragmentary broken wave which can be created from elementary trapezoidal and triangular pulses, can be used not only for the apparatus described in the dissertation but also for other types. Katayev described and investigated an original apparatus (an equivalent circuit of a long-distance communication line) based on the analogy with electromagnetic induction phenomena in long-distance electric power transmission lines. On the basis of this concept, different variants of the apparatus were developed for obtaining a generator of a controllable wave form, and the theory behind them was set forth. Katayev solved the problem of generating pulses of the given form by setting up capacitances by the given law along an artificial line.

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Kolosov, A. A. -- "Resonance Systems and Resonance Amplifiers" (defended 29 June 1950). Official opponents: Professor Yu. B. Kobzarev, Professor N. N. Krylov, and N. I. Chistyakov (all Doctors of Technical Sciences).

Kolosov examined the problem of the maximum-frequency band which can be obtained at a given degree of amplification in different types of tuned amplifiers. He proved that for any type there is a maximum band for any given degree of amplification, as well as a maximum degree of amplification for a given band which cannot be exceeded, no matter how many stages are used. For maximum amplification, there is an optimum number of stages. Kolosov examined the question of selecting parameters for multistage amplifiers, starting from stability of the band width and the magnitude of amplification at the initial tuning frequency. He established a value for acceptable deviation of capacitances from their average value. He determined analytically the noise band of a multistage amplifier. Kolosov presented for the first time appropriate formulas to replace inconvenient graphical constructions. He investigated amplifier stability from the point of view of feedback, as well as the problem of minimum amplifier noise factor.

Terent'yev, B. P. -- "Electric Power Supply for Radio Equipment" (defended 24 April 1948). Official opponents: A. L. Mints, Corresponding Member, Academy of Sciences USSR; I. Ye. Goron, Doctor of Technical Sciences; and P. A. Ostryakov, Doctor of Technical Sciences.

A book with the above title, authorized as a text for communications vtuzes by the Ministry of Higher Education USSR, was presented as a dissertation. The book consists of the following sections: 1. Rectifiers and Ripple Filters, 2. Voltage Regulation and Stabilization, 3. Chemical Sources of Current, and 4. Electric Power Supply of Radio Centers. There is in addition a chapter on vibrator converters. At the end of the book is an annex of text material for concrete planning.

Sverdlovsk Mining Institute imeni Vakhrushev

Volotkovskiy, S. A. -- "Mine-Haulage Electric Traction" (a textbook, defended 22 November 1950). Official opponents: Professor F. N. Shklyarskiy, Doctor of Technical Sciences; Professor P. P. Pirotskiy, Doctor of Technical Sciences; Professor Ye. Ya. Ivanchenko, Doctor of Technical Sciences; and P. M. Trukhin, General Mine Director Third Class.

Tomsk Polytechnic Institute imeni Kirov

Pukhov, G. Ye. -- "Elements of the Theory of Composite Electric Networks" (defended 28 November 1951). Official opponents: Professor P. A. Azbukin, Professor R. A. Voronov, and V. K. Shcherbakov (all Doctors of Technical Sciences).

Pukhov proposes an original and productive method for theoretical analysis of complex electric networks composed of different combinations of multi-terminal networks by breaking the complex networks down into elementary subcircuits. The new method has practical importance for calculating complex electric circuits used in electrical engineering, radar, and other branches of modern electrical engineering.

All-Union Institute of Mechanization of Agriculture

Sazonov, N. A. -- "Transient Phenomena in the Starting of Squirrel-Cage Electric Motors" (defended 16 May 1950). Official opponents: Academician M. G. Yevreinov; Professor D. P. Morozov, Doctor of Technical Sciences; and Professor A. I. Moskvitin, Doctor of Technical Sciences.

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Sazonov analyzed the transient processes occurring during the starting of squirrel-cage motors and reached some conclusions on measures for facilitating the starting of motors in low-power networks.

All-Union Institute of Mechanization of Agriculture and All-Union Institute of Electrification of Agriculture (Combined Scientific Council)

Ebin, L. Ye. -- "Use of the Ground as One of the Conductor. in Rural Power Networks" (defended 18 November 1951). Official opponents: Professor P. G. Grudinskiy; Professor D. A. Gorodskiy, Doctor of Technical Sciences; and A. G. Sakharin, Doctor of Technical Sciences.

Ebin gives formulas for electrical calculation of a "two-conductor and ground" system and for the first time gave a solution which was satisfactory in practice. His methods provide easy solutions to problems dealing with nonsymmetrical conditions in some parallel three-phase power transmission lines and determining, in some cases, the operation of protection.

All-Union Scientific Research Institute of Railway Transport

Chernyshev, M. A. -- "Recovery of Energy at Rectifier Substations Without Using Special Power Transformers" (defended 24 December 1948). Official opponents: Professors V. Ye. Rozenfel'd, V. V. Yasinskiy, and I. L. Kaganov (all Doctors of Technical Sciences).

Chernyshev solved problems dealing with the use of normal rectifier transformers for setting up inverter systems at traction substations. He worked out inverter systems on the basis of research which contributed to the theory of gas-filled rectifiers. Correspondence of all the new theoretical conclusions with actual conditions was established by experimental checking on high-power equipment.

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